Name: Date:

Exam: Function Reflections (Solution version 48)

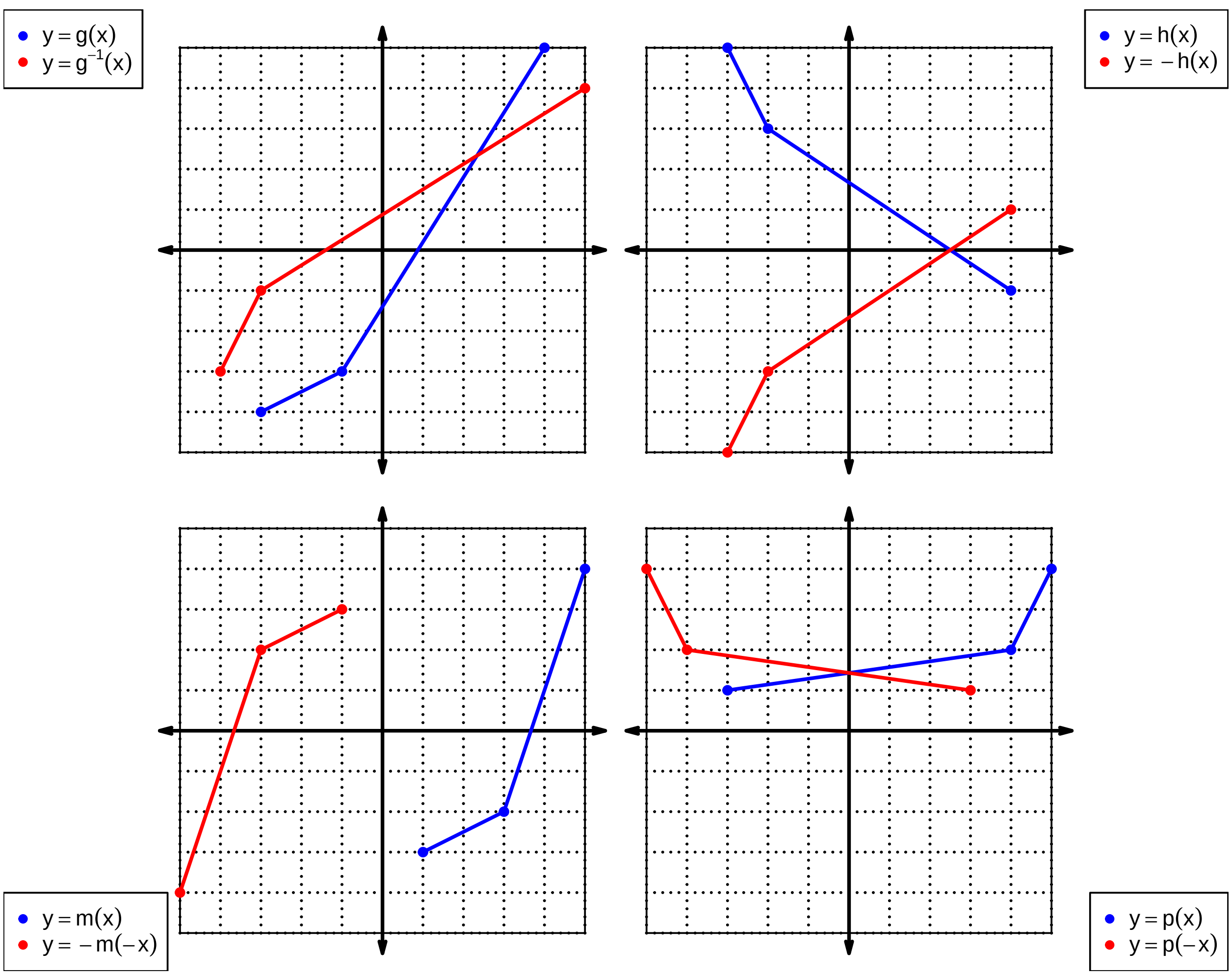
1. Let function f be defined by the polynomial below:

$$f(x) \;=\; -3x^4 - 4x^3 + 2x^2 + 7x - 8$$

Draw lines that match each function reflection with its polynomial:

Reflections	Polynomials
$f(-x)$	$3x^4 - 4x^3 - 2x^2 + 7x + 8$
$-f(x)$	$3x^4 + 4x^3 - 2x^2 - 7x + 8$
$-f(-x)$	$-3x^4 + 4x^3 + 2x^2 - 7x - 8$

2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	9	5	7
2	1	8	5
3	8	1	3
4	3	4	2
5	4	3	9
6	7	2	8
7	2	9	4
8	5	7	1
9	6	6	6

3. Evaluate $g(1)$.

$$g(1) = 5$$

4. Evaluate $f^{-1}(2)$.

$$f^{-1}(2) = 7$$

5. By filling more rows of the table, it is possible to make function h **odd**. If that were done, what would be the value of $h(-4)$?

If function h is odd, then

$$h(-4) = -2$$

6. By filling more rows of the table, it is possible to make function g **even**. If that were done, what would be the value of $g(-9)$?

If function g is even, then

$$g(-9) = 6$$

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7. A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
   Let polynomial p be defined with the following equation:

$$p(x) \;=\; -x^3 + 1$$

   a. Express $p(-x)$ as a polynomial in standard form.

$$\begin{aligned} p(-x) &= -(-x)^3 + 1 \\ p(-x) &= x^3 + 1 \end{aligned}$$

   b. Express $-p(-x)$ as a polynomial in standard form.

$$\begin{aligned} -p(-x) &= -\left(x^3 + 1\right) \\ -p(-x) &= -x^3 - 1 \end{aligned}$$

   c. Is polynomial p even, odd, or neither?

   neither

   d. Explain how you know the answer to part c.

   We see that $p(x)$ is not equivalent to either $p(-x)$ or $-p(-x)$, so p is neither even nor odd.

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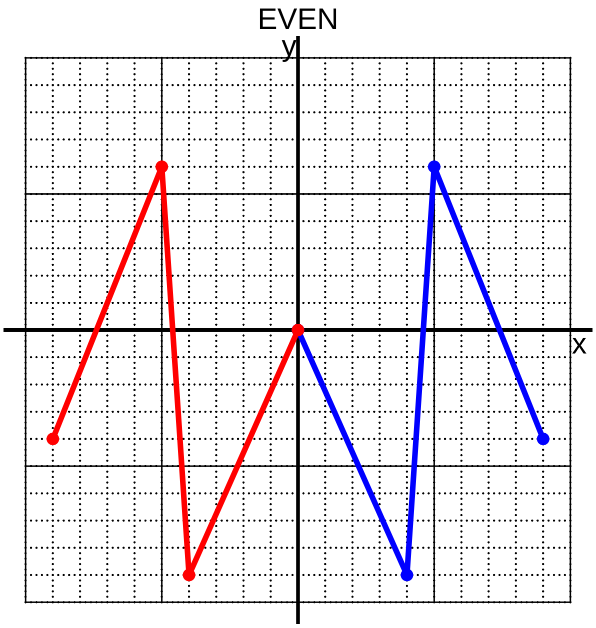
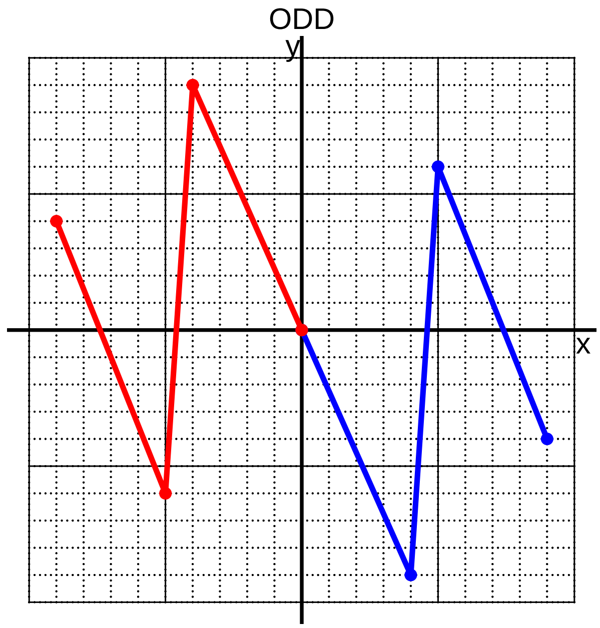
8. I have drawn half of a function. Draw the other half to make it even or odd.





9. Let function f be defined with the equation below.

$$f(x) = \frac{x}{3} - 7$$

a. Evaluate $f(57)$.

step 1: divide by 3
step 2: subtract 7

$$f(57) = \frac{(57)}{3} - 7$$
$$f(57) = 12$$

b. Evaluate $f^{-1}(6)$.

step 1: add 7
step 2: multiply by 3

$$f^{-1}(x) = 3(x+7)$$
$$f^{-1}(6) = 3((6)+7)$$
$$f^{-1}(6) = 39$$

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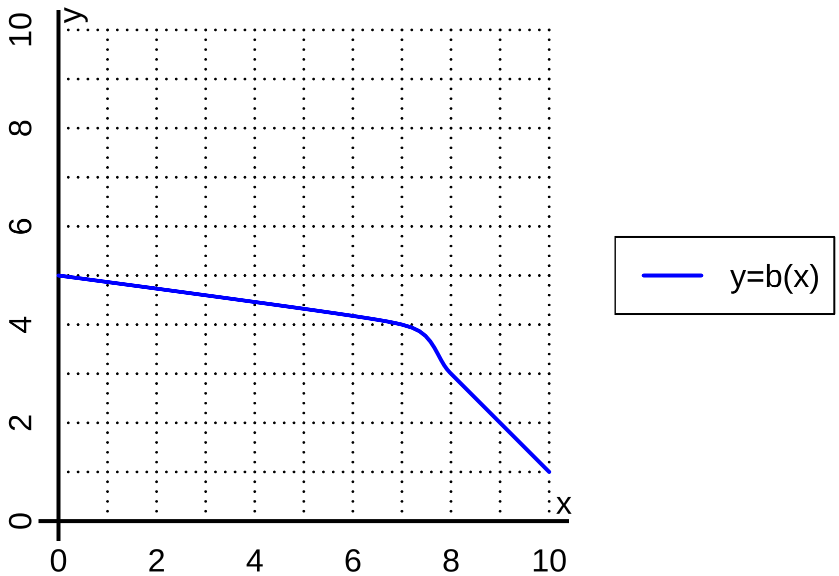
10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(7)$.

$$b(7) \;=\; 4$$

b. Evaluate $b^{-1}(3)$.

$$b^{-1}(3) \;=\; 8$$

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11. Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	9	-9	-9	9
-1	-6	6	6	-6
0	0	0	0	0
1	6	-6	-6	6
2	-9	9	9	-9

b. Is function f even, odd, or neither?

odd

c. How do you know the answer to part b?

Function f is odd because column $-f(-x)$ matches column $f(x)$ exactly.